

CLAIMS

What is Claimed is:

1. A balloon catheter apparatus comprising:
a catheter having at least two lumens that are isolated from each other, one of which being an inflation lumen, and the other of which being a deflation lumen;
a first balloon having an inflatable portion and at least one neck portion, wherein said first balloon is in fluid communication with the inflation lumen, so that a gaseous inflation medium can be introduced into said first balloon through the inflation lumen; and
a second balloon encompassing said first balloon, wherein said second balloon has an inflatable portion and at least one neck portion, and wherein said second balloon is in fluid communication with the deflation lumen, so that any gaseous inflation medium in said second balloon can be discharged from said second balloon through the deflation lumen.
2. The balloon catheter apparatus of claim 1, wherein the first and the second balloons are arranged in substantially concentric relationship.
3. The balloon catheter apparatus of claim 1, wherein the neck portion of the first balloon is leak-tightly engaged with a portion of the catheter, and wherein the inflation lumen of the catheter comprises an opening into said first balloon.
4. The balloon catheter apparatus of claim 3, wherein the neck portion of the second balloon is leak-tightly engaged with another portion of the catheter, and wherein the deflation lumen of the catheter comprises an opening into said second balloon.

5. The balloon catheter apparatus of claim 1, wherein the inflation and deflation lumens are substantially concentric.
6. The balloon catheter apparatus of claim 1, wherein the inflation and deflation lumens are non-concentric.
7. The balloon catheter apparatus of claim 1, wherein the first balloon comprises at least one elastic polymeric material selected from the group consisting of silicone, urethanes, latex, ethylene vinyl acetate (EVA), polyisoprene, styrenic elastomer, polyvinyl chloride, polyamide elastomer, polyester elastomer, polytetrafluoro elastomer, polyamide elastoplastic, and polyester elastoplastic.
8. The balloon catheter apparatus of claim 1, wherein the second balloon comprises at least one elastic polymeric material selected from the group consisting of silicone, urethanes, latex, ethylene vinyl acetate (EVA), polyisoprene, styrenic elastomer, polyvinyl chloride, polyamide elastomer, polyester elastomer, polytetrafluoro elastomer, polyamide elastoplastic, and polyester elastoplastic.
9. The balloon catheter apparatus of claim 1, wherein the first and second balloons are made of the same polymeric material.
10. The balloon catheter apparatus of claim 1, wherein the first and second balloons are made of different polymeric materials.
11. The balloon catheter apparatus of claim 1, wherein the first and second balloons are coated with a friction-reducing material for reducing the coefficient of friction between an outer surface of the first balloon and an inner surface of the second balloon.

12. The balloon catheter apparatus of claim 1, wherein the inflation lumen is coupled with a source of a gaseous inflation medium.
13. The balloon catheter apparatus of claim 12, wherein the gaseous inflation medium is a biologically compatible gas selected from the group consisting of air, O₂, N₂, Ar₂, and CO₂.
14. The balloon catheter apparatus of claim 1, wherein the deflation lumen is in fluid communication with the atmosphere or a subatmospheric environment for discharging the gaseous inflation medium thereinto.
15. The balloon catheter apparatus of claim 1, wherein the second balloon is coated with a therapeutic agent for treating a body cavity into which said balloon catheter is inserted.
16. The balloon catheter apparatus of claim 1, wherein the catheter comprising three isolated lumens, the first of which being a drainage/irrigation lumen, the second of which being an inflation lumen, and the third of which being a deflation lumen, wherein the drainage/irrigation lumen has a first open end and a second, opposite open end that are arranged and configured for draining fluid from or injecting fluid into a body cavity.
17. The balloon catheter apparatus of claim 16, wherein each of the first and second balloons comprises an inflatable portion, a first neck portion, and a second neck portion.
18. The balloon catheter apparatus of claim 17, wherein the first neck portion of the first balloon is leak-tightly engaged with a first portion of the catheter, and the inflation lumen of the catheter comprises an opening into said first balloon, wherein the first

neck portion of the second balloon is leak-tightly engaged with a second portion of the catheter, and the deflation lumen of the catheter comprises an opening into said second balloon, and wherein the second neck portions of the first and the second balloons are leak-tightly engaged with a third portion of the catheter, and said drainage/irrigation lumen extends beyond the first and second balloons.

19. The balloon catheter apparatus of claim 16, wherein the inflation lumen, the deflation lumen, and the drainage/irrigation lumen are substantially concentric.
20. The balloon catheter apparatus of claim 16, wherein the inflation lumen, the deflation lumen, and the drainage/irrigation lumen are non-concentric.
21. A balloon catheter apparatus comprising:
 - a catheter having at least two isolated lumens that are isolated from each other, one of which being a gas lumen, and the other of which being a liquid lumen;
 - a first balloon having an inflatable portion and at least one neck portion, wherein said first balloon is in fluid communication with the gas lumen, so that a gaseous medium can be introduced into said first balloon through the gas lumen; and
 - a second balloon encompassing said first balloon, wherein said second balloon has an inflatable portion and at least one neck portion, and wherein said second balloon is in fluid communication with the liquid lumen, so that a liquid medium can be introduced into said second balloon through the liquid lumen.
22. The balloon catheter apparatus of claim 21, wherein the volumetric ratio of the first balloon and the second balloon as inflated is in a range of from about 1:1 to about 1000:1.

23. The balloon catheter apparatus of claim 21, wherein the liquid medium comprises a liquid selected from the group comprising water and saline solution.
24. The balloon catheter apparatus of claim 21, wherein the liquid medium comprises a heating liquid or a cooling liquid for treatment of a body cavity into which said balloon catheter is inserted.
25. The balloon catheter apparatus of claim 21, wherein the catheter comprising three isolated lumens, the first of which being a drainage/irrigation lumen, the second of which being a gas lumen, and the third of which being a liquid lumen, wherein the drainage/irrigation lumen has a first open end and a second, opposite open end that are arranged and configured for draining fluid from or injecting fluid into a body cavity.
26. The balloon catheter apparatus of claim 25, wherein each of the first and second balloons comprises an inflatable portion, a first neck portion, and a second neck portion, wherein the first neck portion of the first balloon is leak-tightly engaged with a first portion of the catheter, and the gas lumen of the catheter comprises an opening into said first balloon for introducing a gaseous medium thereinto, wherein the first neck portion of the second balloon is leak-tightly engaged with a second portion of the catheter, and the liquid lumen of the catheter comprises an opening into said second balloon for introducing a liquid medium thereinto, and wherein the second neck portions of the first and the second balloons are leak-tightly engaged with a third portion of the catheter, and said drainage/irrigation lumen extends beyond the first and second balloons.
27. The balloon catheter apparatus of claim 25, wherein the gas lumen, the liquid lumen, and the drainage/irrigation lumen are substantially concentric.

28. The balloon catheter apparatus of claim 25, wherein the gas lumen, the liquid lumen, and the drainage/irrigation lumen are non-concentric.
29. A balloon catheter apparatus comprising:
 - a catheter having at least a first lumen and a second lumen that are isolated from each other;
 - a first balloon having a inflatable portion and at least one neck portion, wherein said first balloon is in fluid communication with the first lumen;
 - a second balloon encompassing said first balloon, wherein said second balloon has an inflatable portion and at least one neck portion, and wherein said second balloon is fluid communication with the second lumen.
30. The balloon catheter apparatus of claim 29, wherein the first and the second balloons are arranged in substantially concentric relationship.
31. The balloon catheter apparatus of claim 29, wherein the neck portion of the first balloon is leak-tightly engaged with a portion of the catheter, and wherein the first lumen of the catheter comprises an opening into said first balloon.
32. The balloon catheter apparatus of claim 31, wherein the neck portion of the second balloon is leak-tightly engaged with another portion of the catheter, and wherein the second lumen of the catheter comprises an opening into said second balloon.
33. The balloon catheter apparatus of claim 29, wherein the first and the second lumens are substantially concentric.
34. The balloon catheter apparatus of claim 29, wherein the first and second lumens are non-concentric.

35. The balloon catheter apparatus of claim 29, wherein the first balloon comprises at least one elastic polymeric material selected from the group consisting of silicone, urethanes, latex, ethylene vinyl acetate (EVA), polyisoprene, styrenic elastomer, polyvinyl chloride, polyamide elastomer, polyester elastomer, polytetrafluoro elastomer, polyamide elastoplastic, and polyester elastoplastic.
36. The balloon catheter apparatus of claim 29, wherein the second balloon comprises at least one elastic polymeric material selected from the group consisting of silicone, urethanes, latex, ethylene vinyl acetate (EVA), polyisoprene, styrenic elastomer, polyvinyl chloride, polyamide elastomer, polyester elastomer, polytetrafluoro elastomer, polyamide elastoplastic, and polyester elastoplastic.
37. The balloon catheter apparatus of claim 29, wherein the first and second balloons are made of the same polymeric material.
38. The balloon catheter apparatus of claim 29, wherein the first and second balloons are made of different polymeric materials.
39. The balloon catheter apparatus of claim 29, wherein the first and second balloons are coated with a friction-reducing material for reducing the coefficient of friction between an outer surface of the first balloon and an inner surface of the second balloon.
40. The balloon catheter apparatus of claim 29, wherein the catheter further comprises a third lumen having a first open end and a second, opposite open end that extends beyond the first and second balloons, wherein each of the first and second balloons comprises an inflatable portion, a first neck portion, and a second neck portion, wherein the first neck portion of the first balloon is leak-tightly engaged with a first

portion of the catheter, and the first lumen of the catheter comprises an opening into said first balloon, wherein the first neck portion of the second balloon is leak-tightly engaged with a second portion of the catheter, and the second lumen of the catheter comprises an opening into said second balloon, and wherein the second neck portions of the first and the second balloons are leak-tightly engaged with a third portion of the catheter adjacent to the second, opposite open end of the third lumen.

41. The balloon catheter apparatus of claim 40, wherein the first, second, and third lumens are substantially concentric.
42. The balloon catheter apparatus of claim 40, wherein the first, second, and third lumens are non-concentric.
43. The balloon catheter apparatus of claim 1, being inserted into a body cavity, wherein the first balloon is inflated by the gaseous inflation medium so as to apply a substantially even pressure along a substantial portion of an inner surface of said body cavity for reducing or eliminating bleeding along said substantial portion, and wherein the second balloon conforms to the contour of the first balloon for confining any gaseous inflation medium that escapes from the first balloon.
44. The balloon catheter apparatus of claim 43, wherein the body cavity is selected from the group consisting of uterine cavity, vaginal cavity, oral cavity, nasal cavity, cranial cavity, vertebral cavity, thoracic cavity, mediastinum, and abdominal cavity.
45. The balloon catheter apparatus of claim 15, being inserted into a body cavity, wherein the first balloon is inflated by the gaseous inflation medium so as to apply a substantially even pressure along a substantial portion of an inner surface of said body cavity for reducing or eliminating bleeding along said substantial portion, wherein the

second balloon conforms to the contour of the first balloon for confining any gaseous inflation medium that escapes from the first balloon, and wherein the drainage/irrigation lumen drains blood and/or body fluid from said body cavity.

46. The balloon catheter apparatus of claim 45, wherein the body cavity is selected from the group consisting of uterine cavity, vaginal cavity, oral cavity, nasal cavity, cranial cavity, vertebral cavity, thoracic cavity, mediastinum, and abdominal cavity.
47. The balloon catheter apparatus of claim 45, wherein the drainage/irrigation lumen injects a liquid medium into the body cavity after the blood and/or body fluid is drained, for cleaning the body cavity.
48. The balloon catheter apparatus of claim 21, being inserted into a body cavity, wherein the first balloon is inflated by the gaseous medium and the second balloon is inflated by the liquid medium, so as to apply a substantially even pressure along a substantial portion of an inner surface of said body cavity for reducing or eliminating bleeding along said substantial portion.
49. The balloon catheter apparatus of claim 48, wherein the body cavity is selected from the group consisting of uterine cavity, vaginal cavity, oral cavity, nasal cavity, cranial cavity, vertebral cavity, thoracic cavity, mediastinum, and abdominal cavity.
50. A method for controlling post-partum hemorrhage, comprising the steps of:
providing a balloon catheter apparatus as in claim 1,
inserting the balloon catheter apparatus into at least one of an internal uterine wall area
and a vaginal wall area; and
inflating the first balloon with a gaseous medium so as to apply a substantially even pressure over the at least one wall area for reducing or eliminating bleeding therein.

51. A method for controlling post-partum hemorrhage, comprising the steps of:
- providing a balloon catheter apparatus as in claim 21,
 - inserting the balloon catheter apparatus into at least one of an internal uterine wall area
and a vaginal wall area; and
 - inflating the first balloon with a gaseous medium and the second balloon with a liquid
medium, so as to apply a substantially even pressure over the at least one wall area
for reducing or eliminating bleeding therein.